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(19)

(54) PROTECTIVE HELMET

(71) We, MARTINDALE PROTECTION LIMITED, a Company registered under the Laws of England, of Neasden Lane, London NW10 IRN, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be described in and by the following statement:

This invention relates to a protective helmet for example, for industrial workers working in a polluted atmosphere, and one object is to provide a compact one piece design of helmet which does not require external air lines.

According to the present invention a protective helmet comprises a head cover, a duct containing a motor-driven fan arranged to cause air from the surrounding atmosphere for the wearer to breathe to flow through the duct into the space within the cover, the duct having an inlet opening covered by a filter consisting of a replaceable filter unit in a casing arranged to be readily connected to, and removed from, the duct opening.

Thus the duct may lead from the back around the top of the inside of the head cover, and may lead to the breathing area of the wearer, that is to a position just in front of the wearer's forehead.

The motor is preferably a battery driven motor and preferably has a rechargeable battery. The fan is preferably a centrifugal fan.

The cover may have a single or double transparent glass or plastics visor which could be a permanent fixture or could be capable of being opened or removed.

The cover is preferably of a rigid plastics material strong enough to protect the head from shocks and then the duct opening could be defined by a component moulded with the cover and adapted to receive a replaceable filter component. In one convenient arrangement there is a similar opening at each side of the cover slightly behind the position of the ear.

There will preferably be a neck or shoulder curtain suspended around the lower periphery of the rigid part of the helmet so that the exhausting air passing out between the curtain and the user's body will make it unlikely that any contaminated air can enter the helmet that way.

Preferably there is also a warning device which becomes operative if the air supply through the duct drops below some designated figure, for example 120 litres per minute. If the warning is given the user knows that there is insufficient air either because the filter is blocked or the motor power is failing and he can leave the area before he is in danger of breathing contaminated air.

The invention may be carried into practice in various ways, and one embodiment will now be briefly described by way of example with reference to the accompanying drawing of which the single figure is a perspective view, partially cut away showing a protective helmet embodying the invention.

The helmet comprises a cover 11 of rigid fibre-glass-reinforced plastics material, or moulded from other material strong enough to protect the head against certain objects, for example small rocks which might be disturbed during quarrying. Suspended from around the lower edge of the cover is a flexible curtain 12 which can be draped around the neck, or draped over the shoulders of the user and tied with a cord 20, and in the front of the cover is a transparent rigid plastics visor 21 which may be permanently fixed in position as indicated in the drawing, or could be made to open-possibly around a hinge.

There is an adjustable inner webbing cap (not shown) for fitting over the user's head and above that there is an inner lining 14

which may be a separate piece fitted into the cover and makes a local part of the cover double-walled to define a duct 15 leading from the back around the top of the inside of the cover to the region at the top of the visor for fresh air to be discharged onto the inner side of the visor so that it passes into the breathing area of the wearer.

At the top of the back of the cover the duct embodies a centrifugal fan 16 driven by an electric motor 17 which is powered by a battery which may be rechargeable or 'throwaway'. The battery is carried separately and connected to the motor through a lead 24.

When a rechargeable battery is used, the terminals are accessible from the outside for recharging after a working shift.

Upstream of the fan, the duct divides to have two portions 26, one on each side of the cover, leading to an opening 22 formed in each side at the rear of the position of the user's ear. The cover is moulded to form a seat for a replaceable filter unit 23 engaged in position by a screw or clip-on cover 25 over each of the openings.

When the fan is running, air is drawn in through the two side openings, is filtered by the filters which can approach 100% efficiency at removing micronic foreign particles, and then is fed through the fan and the duct to the user's face. Exhausted air leaves downwards through the bottom of the curtain.

The duct may include a device responsive to the rate of air flow, and if the rate of air flow drops below a certain value, the device is arranged to give a warning at the front of the visor that there is insufficient air so that the user must leave the area in which is is working and take off the helmet.

It will be seen that the helmet is of unitary construction with no external air line connections, and it does not give the user complete mobility, protection against physical blows, against polluted atmosphere, against noise, and against inadequate air supply, and offers protection for the eyes against flying particles.

WHAT WE CLAIM IS:

1. A protective helmet comprising a head cover, a duct containing a motor-driven fan arranged to cause air from the surrounding atmosphere for the wearer to breathe to flow through the duct into the space within the cover, the duct having an inlet opening covered by a filter consisting of a replaceable filter unit in a casing arranged to be readily connected to, and removed from, the duct opening.

2. A helmet as claimed in Claim 1 in which the motor is a battery driven motor.

3. A helmet as claimed in Claim 2 in combination with a rechargeable battery for the motor.

4. A helmet as claimed in Claim 2 in combination with a disposable battery for driving the motor.

5. A helmet as claimed in any of the preceding claims in which the fan is a centrifugal fan.

6. A helmet as claimed in any of the preceding claims having a transparent visor.

7. A helmet as claimed in Claim 6 in which the visor is capable of being opened or removed.

8. A helmet as claimed in any of the preceding claims in which the cover is of a rigid plastics material.

9. A helmet as claimed in any of the preceding claims in which there are two or more openings each behind the position of a wearer's ear.

10. A helmet as claimed in any of the preceding claims includng a head harness.

11. A helmet as claimed in any of the preceding claims including a curtain suspended around the lower periphery of the cover.

12. A helmet as claimed in any of the preceding claims including a warning device arranged to give the wearer a warning if the air supply through the duct drops below a certain level.

13. A helmet as claimed in any preceding claims in which the duct leads from the back around the top of the inside of the head cover.

14. A helmet as claimed in any preceding claim in which the duct leads to the breathing area of the wearer.

15. A protective helmet constructed and arranged substantially as herein specifically described with reference to the accompanying drawing.

KILBURN & STRODE,
Chartered Patent Agents,
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1574311 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*